

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

4100-117P

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

09/622982

INTERNATIONAL APPLICATION NO.

PCT/EP99/01220

INTERNATIONAL FILING DATE

February 25, 1999

PRIORITY DATE CLAIMED

February 25, 1998

## TITLE OF INVENTION

ARRANGEMENT FOR OPTIMIZING THE DATA TRANSMISSION OVER A BIDIRECTIONAL RADIO CHANNEL

## APPLICANT(S) FOR DO/EO/US

DIRSCHEDL, Werner; RIEK, Rainer; GREINER, Gunter

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39 (1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19<sup>th</sup> month from the earliest claimed priority date
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☒ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(3)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(2)).
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

## Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.-1449 and International Search Report (PCT/ISA/210), German Search Report and 15 references
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.  
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
  - 1.) One (1) sheet of Formal Drawings
  - 2.) One (1) sheet of Translated Drawings

09/622,982

PCT/EP99/01220

4100-117P

17. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5):**

Neither international preliminary examination fee (37 CFR 1.482)  
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO  
and International Search Report not prepared by the EPO or JPO. . . . . \$970.00

International preliminary examination fee (37 CFR 1.482) not paid to  
USPTO but International Search Report prepared by the EPO or JPO . . . . . \$840.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO  
but international search fee (37 CFR 1.445(a)(2)) paid to USPTO. . . . . \$690.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO  
but all claims did not satisfy provisions of PCT Article 33(1)-(4) . . . . . \$670.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO  
and all claims satisfied provisions of PCT Article 33(1)-(4). . . . . \$96.00

**ENTER APPROPRIATE BASIC FEE AMOUNT =**

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☒ 30  
months from the earliest claimed priority date (37 CFR 1.492(e)).

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total Claims	4 - 20 =	0	X \$18.00
Independent Claims	1 - 3 =	0	X \$78.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable) None			+ \$260.00

**TOTAL OF ABOVE CALCULATIONS =**

Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity statement  
must also be filed (Note 37 CFR 1.9, 1.27, 1.28).

**SUBTOTAL =**

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30  
months from the earliest claimed priority date (37 CFR 1.492(f)).

**TOTAL NATIONAL FEE =**

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be  
accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +

**TOTAL FEES ENCLOSED =**

Amount to be:  
refunded \$  
charged \$

a. ☒ A check in the amount of \$ 970.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account. No. \_\_\_\_\_ in the amount of \$ \_\_\_\_\_ to cover the above fees.  
A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any  
overpayment to Deposit Account No. 02-2448.

**NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.**

Send all correspondence to:

**Birch, Stewart, Kolasch & Birch, LLP** or Customer No. 2292  
P.O. Box 747  
Falls Church, VA 22040-0747  
(703)205-8000

SIGNATURE

**TIM R. WYCKOFF**  
NAME

**#46,175 (TRW)**  
REGISTRATION NUMBER

09/622982

533 Rec'd PCT/PTO 25 AUG 2000

PATENT  
4100-117P

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: DIRSCHEDL, Werner et al.  
Int'l. Appl. No.: PCT/EP99/01220  
Appl. No.: New Group:  
Filed: August 25, 2000 Examiner:  
For: ARRANGEMENT FOR OPTIMIZING THE DATA  
TRANSMISSION OVER A BIDIRECTIONAL  
RADIO CHANNEL

PRELIMINARY AMENDMENT

**BOX PATENT APPLICATION**

Assistant Commissioner for Patents  
Washington, DC 20231

August 25, 2000

Sir:

The following Preliminary Amendments and Remarks are respectfully submitted in connection with the above-identified application.

**AMENDMENTS**

**IN THE SPECIFICATION:**

Please amend the specification as follows:

Before line 1, insert --This application is the national phase under 35 U.S.C. § 371 of PCT International Application No. PCT/EP99/01220 which has an International filing date of February 25, 1999, which designated the United States of America.--

**IN THE ABSTRACT:**

Please add the Abstract as follows:

--The invention relates to an arrangement for optimizing the data transmission over a bidirectional radio channel. According to the invention, the digital data to be transmitted according to

a data transmission protocol is divided into individual data packets in each of two transmitting/receiving stations. In each transmitting/receiving station, the number and/or priority and/or type (e.g. information, control characters, repeat blocks) of the data packets generate by the data transmission protocol of the higher level and transmitted to the respective transmitter of the station is determined (data packet identifications). According to the data packet identifications, the data transmission protocol is then selected in at least one of the stations in accordance with an optical utilization of the radio channel capacity.--

**IN THE CLAIMS:**

Please amend the claims as follows:

**Claim 2:** Line 1, change "Method" to --The method--; and  
change "Claim" to --claim--

**Claim 3:** Line 1, change "Method" to --The method--; and  
change "Claim" to --claim--

**Claim 4:** Line 1, change "Method" to --The method--; and  
change "one of the preceding claims" to  
--claim 1--

**REMARKS**

The specification has been amended to provide a cross-reference to the previously filed International Application. The claims have also been amended to delete multiple dependents and to place the application into better form for examination. Entry

Docket No. 4100-117P

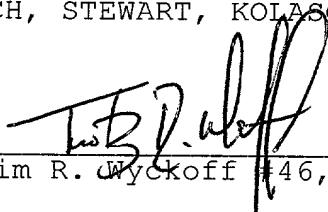
of the present amendment and favorable action on the above-identified application are respectfully requested.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

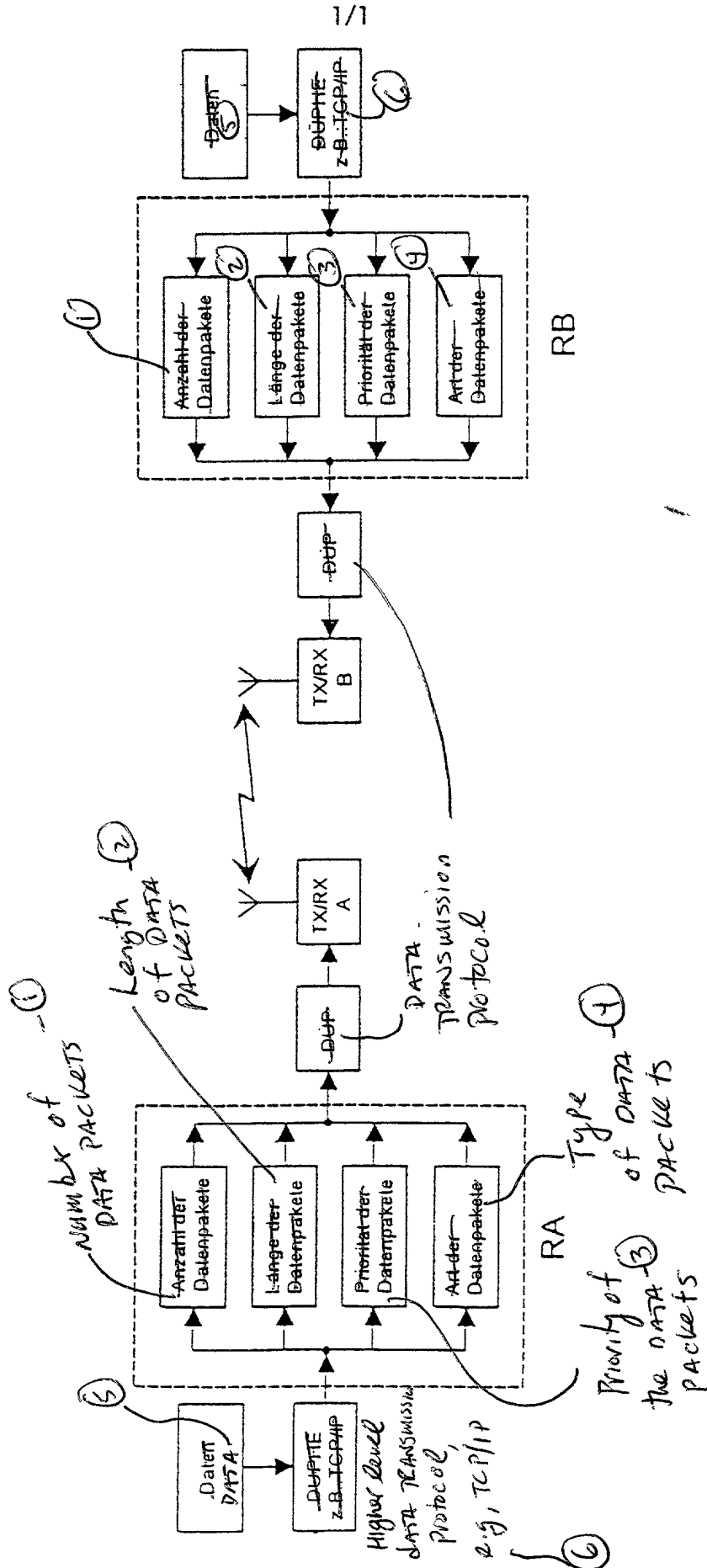
By

  
Tim R. Wyckoff #46, 175

TRW/cqc  
4100-117P

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(Rev. 04/19/2000)



18-01-2000

EP 009901220

1509-P

**Method of Optimizing the Data Transmission**  
**over a Bidirectional Radio Channel**

This invention relates to and is based on a method according to the definition of the species of the main claim.

It is known that for transmission of digital data such as digitized speech or other digital information over a (bidirectional) shortwave radio channel in both transmission directions, the digital data to be transmitted, which is transmitted over the radio channel alternately in forward and reverse directions (simplex operation), can be processed according to a predetermined data transmission protocol, also referred to below as DÜP, and divided into individual data packets (e.g., according to A. S. Tanenbaum, *Computer Networks*, Prentice Hall, Englewood Cliffs, 1981, pages 136 ff.; European Patent No. 730,356). This digital data for transmission can also be processed first according to another data transmission protocol at a higher level, i.e., a higher-level data transmission protocol, also referred to below as DÜPHE, e.g., according to the known TCP/IP method (transmission control protocol/Internet protocol). For optimizing data transmission over such a bidirectional radio channel, there have already been proposals to determine the bit error rate at the receiving end and transmit it back to the transmitter, where the length of the data packets is revised accordingly (older German Patent Application 196 51 593.9). Furthermore, it is also known that in a data transmission system that operates by the duplex method and has two separate transmission channels, the data rate can vary as a function of the prevailing data occurrence to make the transmission less sensitive to interference (U.S. Patent No. 5,513,213).

Depending on the type of digital data to be transmitted and the higher-level data transmission protocol (DÜPHE) processing the data, such as TCP/IP, the resulting data packets and acknowledgments in both transmission directions may vary greatly in length and frequency, and thus data throughput can be greatly impaired even when using the above-mentioned optimization

**ART 34 AMDT**

of data transmission with the data transmission protocol DÜP.

Therefore, the object of this invention is to create a method for optimizing data transmission over a bidirectional radio channel, where the available bidirectional channel capacity is optimally adapted to the data occurrence in both directions.

Starting with a method according to the definition of the species of the main claim, this object is achieved by the characterizing features of the main claim. Advantageous refinements are derived from the subordinate claims.

According to this invention, before transmitting the data packets of the data transmission protocol DÜP, data packet identifiers of the higher-level data transmission protocol DÜPHE are determined, i.e., the number and/or length and/or priority and/or type of data packets is determined, and the length of data packets of data transmission protocol DÜP is adjusted as a function thereof. A wide variety of possible combinations are conceivable for these data packet identifiers. In the simplest case, it may be sufficient to determine only the instantaneous number of data packets or the expected number of data packets. The adjustment is better if, in addition, the instantaneous or expected length of the data packets of the data to be transmitted is also taken into account as an identifier. It is even better to determine the instantaneous or expected priority of incoming data packets from the higher-level data transmission protocol DÜPHE to data transmission protocol DÜP or the instantaneous or expected type of data (information, acknowledgment, control commands or the like). Another identifier may be the respective relevance of data packets of the higher-level data transmission protocol DÜPHE, e.g., the fact that this is a repeat packet. This quantitative determination of data packet identifiers takes place on both sides of the wireless link, and then the length of data packets produced by data transmission protocol DÜP can be adjusted on the basis of these identifiers in the sense of optimum utilization of radio channel capacity, and thus also the frequency in switching between the two directions of the radio channel can be adjusted.

REVISED PAGE

The figure shows a schematic diagram of a bidirectional shortwave connection between a transmitting and receiving station A and a transmitting and receiving station B. Digital data to be transmitted is divided by a higher-level data transmission protocol DÜPHE such as TCP/IP into individual data packets that are sent in succession over a radio driver RA to the data transmission protocol DÜP of the actual transmitter of station A and transmitted over the radio channel to remote station B, where the data packets are analyzed in the receiver there according to its data transmission protocol DÜP. Digital data to be transmitted is processed in the same way in the transmission operation of remote station B and sent over a radio driver RB to the data transmission protocol DÜP of the transmitter of station B and transmitted over the radio channel to station A. The packets generated by the respective data transmission protocol DÜP may be composed of a variable number of frames, for example, where the number of frames per packet may be between 1 and 15, for example, depending on the quality of the wireless link. Each frame may in turn consist of a 5 byte header of control information, followed by a data part between 4 and 250 bytes long, for example, and a redundancy code (CRC) 2 bytes long, for example. Through the choice of the data volume per frame and the choice of the number of frames per packet, the packet length of the data transmission protocol DÜP can be selected as desired, e.g., between 64 bytes and 8 kbytes, in each station A and B at the transmitting end.

Of the incoming data packets in radio drivers RA and RB from the higher-level data transmission protocol DÜPHE, the number, length, priority and type (control information, data information, acknowledgments, etc.) are determined, and depending on these characteristics, the data transmission protocol DÜP with which the data packets to be transmitted are divided into individual data packets before being transmitted over the transmitter of station A is adjusted accordingly. For example, if a number of short data packets of 100 bytes, for example, to be transmitted is detected in radio driver RA, then the length of data packets generated according to the data transmission protocol DÜP is set at this length. If a plurality of long packets of several kilobytes, for example, arrive at the radio driver, the packets DÜP are lengthened as much as allowed by the data occurrence at the remote station and the instantaneous channel quality.

CLAIMS

1. Method of transmitting data over a bidirectional radio channel, where digital data to be transmitted is divided into individual data packets according to a first data transmission protocol (DÜPHE), then at the two transmitting and receiving stations of the radio channel, the data is divided according to a second data transmission protocol (DÜP) into individual data packets which are transmitted alternately forward and in reverse over the radio channel by the simplex method,

characterized in that

at each transmitting and receiving station (A or B)

the number

and/or the length

and/or the priority

and/or the type of data packets generated by the first data transmission protocol (DÜPHE) and sent to the respective transmitter of the station is determined as the data packet identifier, and the length of the data packets generated by the second data transmission protocol (DÜP) is determined in at least one of the transmitting and receiving stations as a function of these data packet identifiers in the sense of optimum utilization of radio channel capacity.

2. Method according to Claim 1,

characterized in that

data packet identifiers are determined at one sending and receiving station (e.g., A), and the data packet length is determined as a function thereof at the same station.

3. Method according to Claim 1,

characterized in that

data packet identifiers determined at one transmitting and receiving station (e.g., A) are transmitted to the remote station (e.g., B) where they are used to influence the length of the data packets in the second data transmission protocol (DÜP).

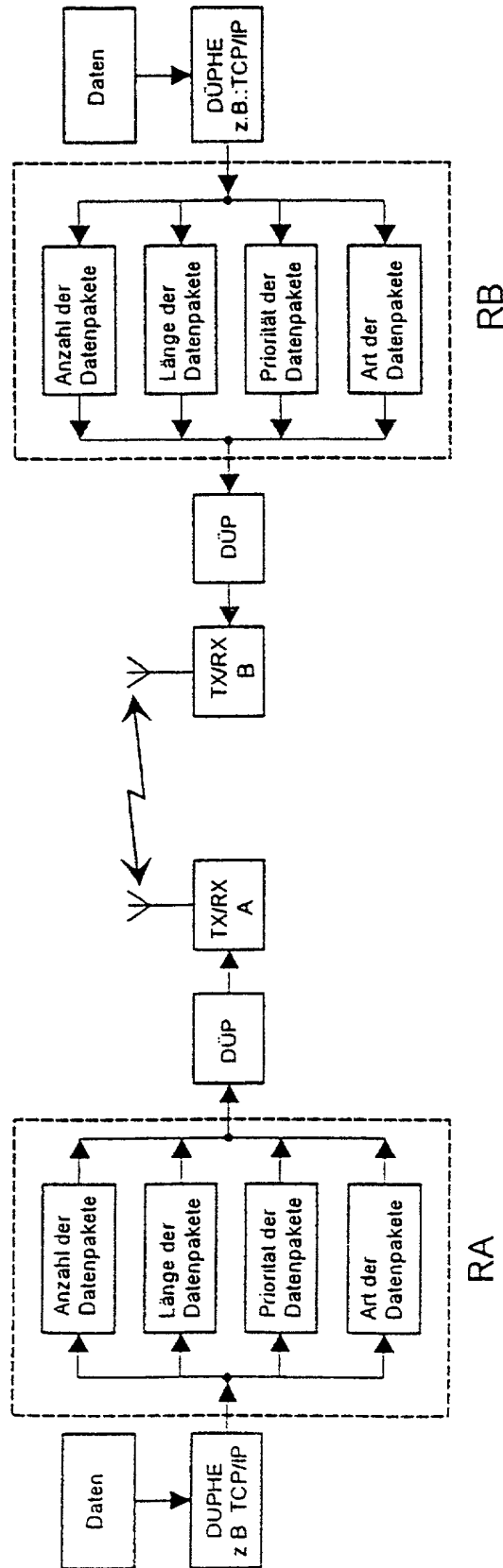
REVISED PAGE

4. Method according to one of the preceding claims,

characterized in that

the data packet identifiers determined at both transmitting and receiving stations (A and B) are transmitted to the respective remote station, where they are used to set the length of the data packets of the second data transmission protocol (DÜP).

1/1



Attorney Docket No. 4100-117P

**BIRCH, STEWART, KOLASCH & BIRCH, LLP**P.O. Box 747 • Falls Church, Virginia 22040-0747  
Telephone: (703) 205-8000 • Facsimile: (703) 205-8050PLEASE NOTE:  
YOU MUST  
COMPLETE THE  
FOLLOWING**COMBINED DECLARATION AND POWER OF ATTORNEY  
FOR PATENT AND DESIGN APPLICATIONS**

As a below named inventor, I hereby declare that: my residence, post office address and citizenship are as stated next to my name; that I verify believe that I am the original, first and sole inventor (if only one inventor is named below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Insert Title:

ARRANGEMENT FOR OPTIMIZING THE DATA TRANSMISSION OVER A BIDIRECTIONAL RADIO CHANNELFill in Appropriate  
Information -  
For Use Without  
Specification  
Attached:

the specification of which is attached hereto. If not attached hereto,

the specification was filed on \_\_\_\_\_ as  
United States Application Number \_\_\_\_\_  
and amended on August 25, 2000 (if applicable) and/or  
the specification was filed on February 25, 1999 as PCT  
International Application Number PCT/EP99/01220 and was  
amended under PCT Article 19 on \_\_\_\_\_ (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56. I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representative or assigns more than twelve months (six months for designs) prior to this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

**Prior Foreign Application(s)****Priority Claimed**

<u>198 07 931.1</u> (Number)	<u>Germany</u> (Country)	<u>February 25, 1998</u> (Month/Day/Year Filed)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
_____ (Number)	_____ (Country)	_____ (Month/Day/Year Filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
_____ (Number)	_____ (Country)	_____ (Month/Day/Year Filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
_____ (Number)	_____ (Country)	_____ (Month/Day/Year Filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below.

_____ (Application Number)	_____ (Filing Date)
_____ (Application Number)	_____ (Filing Date)

All Foreign Applications, if any, for any Patent or Inventor's Certificate Filed More than 12 Months (6 Months for Designs) Prior to the Filing Date of This Application:

Country	Application Number	Date of Filing (Month/Day/Year)
_____	_____	_____
_____	_____	_____

Insert Requested  
Information:  
(if appropriate)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States and/or PCT application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States and/or PCT application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to the patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

Insert Prior U.S.  
Application(s):  
(if any)

_____ (Application Number)	_____ (Filing Date)	_____ (Status - patented, pending, abandoned)
_____ (Application Number)	_____ (Filing Date)	_____ (Status - patented, pending, abandoned)

Attorney Docket No. 4100-117P

I hereby appoint the following attorneys to prosecute this application and/or an international application based on this application and to transact all business in the Patent and Trademark Office connected therewith and in connection with the resulting patent based on instructions received from the entity who first sent the application papers to the attorneys identified below, unless the inventor(s) or assignee provides said attorneys with a written notice to the contrary:

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Joseph A. Kolasch  
Bernard L. Sweeney  
Charles Gorenstein  
Leonard R. Svensson  
Andrew D. Meikle  
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John W. Bailey  
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(Reg. No. 21,066)  
(Reg. No. 22,463)  
(Reg. No. 24,448)  
(Reg. No. 29,271)  
(Reg. No. 30,330)  
(Reg. No. 32,868)  
(Reg. No. 32,334)  
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(Reg. No. 32,644)  
(Reg. No. 32,181)  
(Reg. No. 34,313)  
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or

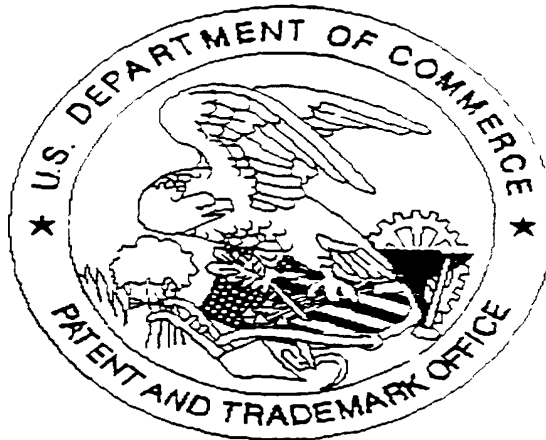
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

GIVEN NAME/FAMILY NAME Werner DIRSCHEDL		INVENTOR'S SIGNATURE <i>Werner Dirschedl</i>	DATE* 14.9.00
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GIVEN NAME/FAMILY NAME Guenther GREINER		INVENTOR'S SIGNATURE <i>Guenther Greiner</i>	DATE* 14.9.00
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GIVEN NAME/FAMILY NAME		INVENTOR'S SIGNATURE	DATE*
Residence (City, State & Country)		CITIZENSHIP	
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United States Patent & Trademark Office  
Office of Initial Patent Examination -- Scanning Division



Application deficiencies were found during scanning:

☒ Page(s) 4 of the specification were not present:  
for scanning. (Document title)

☐ Page(s) \_\_\_\_\_ of \_\_\_\_\_ were not present:  
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☐ Scanned copy is best available.